Table of Contents

Toxicology International Vol 13 (2) December, 2006

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Division of Pathology, Indian Veterinary Research Institute, Izatnagar-243 122

Effect of selenium supplementation on chlorpyrifos induced enzymic alterations in buffalo calves

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Hypolipidaemic and anti-atherogenic activity of petroleum ether extract of neem *(Azadirachta indica*) seed husk and kernel in streptozotocin- induced diabetic rats

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Analysis of heavy metals in herbal extracts of high altitude growing plants *Hippophae rhamnoides* and *Rhodiola imbricata*

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Effect of erythrosine on testicular function of mice

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Review Article

Status of Biopesticides - Indian Scene

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Abstract

It is well known that most of the chemical pesticides are responsible for a variety of known and unknown adverse effects in animal and human health. These chemicals also have adverse effects on our environment. Despite large consumption of chemical pesticides, it is estimated that crop losses vary between 20-30% due to pests alone. Keeping this in view and fueled by lavish venture capital money and unrestrained enthusiasm for biotechnology, a flush of biopesticide companies arose in the 1980s to exploit the extraordinary potential of biopesticides offered as environmentally benign alternatives to chemicals. In India, till date only 12 biopesticides (*Bacillus thuringiensis var. israelensis, Bacillus thuringiensis var. kurstaki, Bacillus thuringiensis var. galleriae, Bacillus sphaericus, Trichoderma viride, Trichoderma harzianum, Pseudomonas fluoresens, Beauveria bassiana,* NPV of *Helicoverpa armigera,* NPV of *Spodoptera litura, Neem based pesticides, Cymbopogan*) have been registered against 194 chemicals which are used as chemical pesticides. Most of these biopesticides find use in public health for the control of malaria, except a few that are used in agriculture. The other technologies include i) use of transgenic plants for pest management and ii) a number of beneficial insects and worms that fight the nastier ones is being encouraged. In addition, the Centre for Indian Knowledge Systems (CIKS) has attempted to identify the technologies that farmers were using for pest control before chemical pesticides came into the picture. The preparation of these products is extremely simple, as is their application. In terms of efficiency, these products are very good and in certain cases, are even more efficient than the commercially available products. CIKS' work has been to see that the extracts developed by farmers in their own backyards are as efficient as or more efficient than what is available in the market. Its motive has been one of self-reliance. This is also an innovation which is economically viable for small farmers in India.

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Toxicoinformatics - Review
- An Informatics talk on Toxicology

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Abstract

The mapping of the human genome and the determination of corresponding gene functions, pathways, and biological mechanisms are driving the emergence of new research fields of toxicogenomics and systems toxicology. Many technological advances such as microarrays are enabling this paradigm shift that indicates an unprecedented advancement in the methods of understanding the expression of toxicity at the molecular level. As the computational methods and informatics technologies gained their entrance into toxicological research studies, it paved a new way into toxicoinformatics- a new cutting-edge technology in the scientific community.

Keywords: Toxicogenomics, bioinformatics, toxicoinformatics, metabonomics, microarray, TIS, EDKB.

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Alterations in lipid peroxidation, glutathione and related enzymes in experimentally induced subacute toxicity of selenium in cow calves

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Abstract

In the present study, the effect of subacute oral selenium toxicosis on the rate of lipid peroxidation, antioxidant enzymes (catalase and superoxide dismutase) and on the amount of glutathione and the enzymes related to its metabolism (glutathione-S-transferase, glutathione reductase and glutathione peroxidase) was studied in crossbred cow calves. Sodium selenite (@ 2.5 mg/kg) was administered orally to cow calves daily for 21 days and blood samples collected at different time intervals were analyzed for various biochemical parameters. The lipid peroxidation of erythrocytes increased significantly whereas reduced glutathione content decreased. The blood selenium levels showed a high positive correlation with glutathione peroxidase activity, which was significantly elevated throughout the treatment period. The activities of glutathione-S-transferase, glutathione reductase, superoxide dismutase and catalase were significantly increased. The 2.5 fold increase in lipid peroxidation and decreased glutathione levels suggested oxidative damage to erythrocytes during subacute selenium toxicosis.

Key Words: Selenium, antioxidants, oxidative stress, calves.

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Immunotoxicity studies of Imidacloprid in rats

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Abstract

Imidacloprid is used as an acaricide in agriculture and as ectoparasiticide in pet animal practice. Human beings as well as animals are likely to be exposed to it for prolonged period. Three groups of Sprague Dawley rats were exposed to different doses of oral imidacloprid for 28 days with the fourth group serving as control. The effect of imidacloprid on immune system was studied using haemagglutinating antibody titre (HAT), delayed type of hypersensitivity (DTH) response, leucocytic migration inhibition (LMI) against sheep RBCs and the phagocytic index as the parameters. There was progressive and proportional decrease in HAT and DTH response in treated rats. Phagocytic index and leucocytic migration were also reduced suggesting its immunotoxic effect.

Key words: Immunotoxicity, Imidacloprid, Rat.

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Behavioural and neurotoxic effects in Wistar rats induced by low doses of ochratoxin A

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Abstract

. The effect of ochratoxin A (OTA) on behavioural changes and pathology of brain was studied in seven weeks-old male Wistar rats administered orally with OTA @ 0.25 mg and 0.50 mg /kg body weight (group A and group B, respectively), daily for four weeks. Pathomorphological changes in brain at intervals of 2 days and 1, 2, 3 and 4 weeks , while behavioural studies at the end of 4th week post OTA exposure were studied. Behavioural studies in rats of higher dose (0.5mg OTA/kg bw) revealed significant changes in both spontaneous and forced motor activities. OTA-treated rats showed reduced number of both horizontal and vertically directed movements. Rotarod test showed that the OTA-treated rats could remain on the rotating rod for a considerably lesser time than that of control rats. The pathological lesions in brain were more severe in the higher dose group rats which included congestion and a significant increase in relative weight. Histopathological changes in the brain were characterized by degenerative changes with satellitosis of glial cells around the degenerating neurons in group-A rats. Rats in group-B showed engorgement of blood vessels of the meninges and focal gliosis in the cerebellar peduncle with perivascular cuffing. At later stages of ochratoxicosis, cerebrum revealed haemorrhages, extensive neuronal degeneration with neuronophagia and perinuclear vacuolation in the neurons. It was concluded that the effect of OTA on the brain was dose-dependent and the rats exposed to even low levels of OTA exhibited significant behavioural changes suggesting a potential neurotoxic effect of OTA.

Key words : Ochratoxin A, neurotoxic effect, pathomorphological changes, Wistar rats

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Effect of selenium supplementation on chlorpyrifos induced enzymic alterations in buffalo calves

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Abstract

Repeated oral administration of chlorpyrifos, an organophosphorus insecticide, at the dose rate of 0.05 mg/kg/day for 150 consecutive days produced very mild signs of toxicity in buffalo calves. Chlorpyrifos produced significant inhibition of erythrocyte cholinesterase (53.3%) and plasma cholinesterase (56.7%) enzymes. Chlorpyrifos significantly elevated the plasma levels of alanine aminotransferase (100.2%), aspartate aminotransferase (64.3%), alkaline phosphatase (53.7%) and acid phosphatase (88.3%). Supplementation with selenium as sodium selenite (@ 0.05 mg/kg/day) produced a beneficial effect on the buffalo calves intoxicated with chlorpyrifos as evidenced by a lesser extent of enzymes elevation, to the extent of 73.0% in alanine aminotransferase, 44.4% in aspartate aminotransferase, 44.9% in alkaline phosphatase and 63.6% in acid phosphatase.

Key words: Chlorpyrifos, buffalo calves, selenium, cholinesterase, phosphatase, aminotransferase

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Hypolipidaemic and anti-atherogenic activity of petroleum ether extract of neem *(Azadirachta indica*) seed husk and kernel in streptozotocin- induced diabetic rats

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Abstract

Effect of petroleum ether extracts of neem *(Azadirachta indica)* seed kernel (NSK) and husk (NSH) was studied in experimentally-induced diabetes mellitus condition in adult male rats. Diabetes was produced by administration of intravenous infusion of streptozotocin (STZ, 55 mg/kg b.wt. tail vein). Plasma triglycerides, total cholesterol, LDL- cholesterol, HDL-cholesterol and atherogenic index were investigated. The results were compared with rats (positive control) receiving insulin 6 U/kg, i.p. NSK (2 gm/kg, b.wt.) and NSH (0.09 gm/kg, b.wt.) were given orally daily for 28 days. Blood samples were collected at 0hr, 7th, 14th, 21st and 28th days for biochemical estimations.

NSK significantly decreased plasma triglycerides and total cholesterol at day 14, 21 and 28.The mean values were comparable with positive control group. There was insignificant change in plasma cholesterol levels after NSH. However, NSK significantly reduced LDL-cholesterol after 14 day of treatment. After NSK treatment, plasma HDL- cholesterol also significantly improved on day 28 whereas atherogenic activity was decreased.From this study, it may be concluded that both NSK and NSH have significant hypolipaedemic and anti-atherogenic activities in STZ- induced diabetic rats.

Key words: Diabetes, lipidaemic, atherogenic, Azadirachta

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Analysis of heavy metals in herbal extracts of high altitude growing plants *Hippophae rhamnoides* and *Rhodiola imbricata*

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Abstract

Seabuckthorn (*Hippophae rhamnoides* L., Elaeagnaceae), growing at high altitude of 2500-4000 m, is a dwarf to tall (2-5m) plant whereas Rhodiola (*Rhodiola imbricata* Edgew, Crassulaceae), known as golden root, is a perennial herb growing on rocky slopes in drier areas of Western Himalaya at an altitude of 4000-5000 m. Both the medicinal plants contain wide range of bioactive substances and used in traditional medicines. Heavy metal toxicity of herbal preparations is of major concern. The concentrations of heavy metals (As, Pb, Hg, Cd, Zn, Cu, Cr) were measured by atomic absorption spectrometry in the aqueous extracts of Seabuckthorn leaf and berries, and Rhodiola roots and compared with the maximum permissible values. The studied heavy metal concentrations in aqueous extracts of both the plant products, except chromium, were below the maximum permissible values. The chromium levels in vacuum dried aqueous extract of dried Rhodiola roots and lyophilized aqueous extract of dried Seabuckthorn leaves were 3.2 ppm and 3.0 ppm, respectively, slightly higher than the WHO proposed limit of 2.0 ppm. The results suggest that the Seabuckthorn and Rhodiola herbal products were safe in respect of heavy metals.

Keywords: Metal pollution; High altitude; Seabuckthorn; Rhodiola; AAS

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Effect of erythrosine on testicular function of mice

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Abstract

In an investigation of the potential adverse effects of the food colorant erythrosine on the spermatogenesis process, fifty male Swiss albino mice were orally intubated with varied dosage (0, 64, 128 and 256 mg /kg. b.wt.) for a period of 30 days. The

normal average epididymal sperm counts as well as the percentage of motile sperms were significantly (P< 0.001) inhibited with increased dosage. Moreover, erythrosine was shown to disrupt the normal morphology of the sperm head, a dose dependent increase in the percentage of abnormal sperms (microhead, macrohead, deformed head, broken head, coiled sperms and broken tails) were observed in all the treatment groups. These findings indicate that erythrosine in the used doses has a potential toxic effect on spermatogenesis in mice and in turn it may result in testicular dysfunction and reproductive performance.

Key words: Erythrosine, mice, sperm motility, sperm count, sperm abnormalities